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EPIDEMIC PROCESS

[Following is the translation of a book review by A. Z. Ter-Karapetyan, published in the Russian-language periodical Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (Journal of Microbiology, Epidemiology and Immunobiology) No. 9, 1966, pages 140-142. Translation performed by Sp/7 Charles T. Ostertag, Jr.]

Epidemic Process by V. D. Belyakov, "Meditsina" Publishing House, Leningrad, 1964, 244 pages, circulation 3200 copies.

Few papers have been published on the theoretical problems of epidemiology. Therefore, it is understandable that a large group of epidemiologists should be interested in the publication, since the comparatively small circulation of this book was used by very rapidly.

The monograph consists of an introduction and six chapters, dealing with all the basic problems in the theory of the epidemic process; at the end of the book there is a literary index consisting of 117 titles.

In the introduction the author correctly points out the necessity for the "systematization of the various theoretical generalizations and the unification of a specific terminology". He notes the irregularity in the attempts made by a number of authors to replace existing customary terms with others.

The title of Chapter I ("Epidemic Process - The Subject of Epidemiology") reflects the main trend in the development of the science of epidemiology which has been followed and (as far as we know) is being followed by all our own epidemiologists, and which received recognition at the Paris Symposium of Epidemiologists (January 1960). However, abroad and recently with us (see, for example, the article by A. Chakin, "Epidemiology of Malignant Neoplasma" in "Meditsinskaya Gazeta" of 12 October 1965) a tendency has been noted to include among the tasks of epidemiology the study of other processes also, in particular the spreading of non-infectious diseases, though the regularities of their occurrence in human society are different from the occurrence of infectious diseases. Here they ignore that generally accepted fact that the process of spreading infectious diseases has not only social, but also specific biological peculiarities, the most important of which is the inter-dependence between the links of this chain; each case of disease is the result of another case.

However, we cannot agree with the author, who runs to another extreme, considering that in the study of non-infectious diseases it is possible

to make use of only the experience of epidemiology, but not its method (page 36). On the other hand, the method of investigation presented (pages 32-33) confirms in principle its suitability for the study of non-infectious morbidity, if only in section "D" the task is considered to be the exposure not of the source of infection and routes of transmission of the causative agent, but the conditions which contributed to the emergence of new cases. But then, this is also the main mission of the epidemiologist.

The author correctly states that the epidemiological method of investigation should be viewed as a combination of procedures and methods, developed for the study of an epidemic process. These include observation (investigation), historical and geographical description and comparison, experiment, and statistical and logical analysis. However, from here there is no resulting necessity at all for the partition of the single epidemiological science into epidemiological immunology (or immunological epidemiology ?), geographical epidemiology, experimental epidemiology, statistical epidemiology, etc. Remaining a single science, in our view, epidemiology should be enriched by the utilization of the most diverse methods, including those stated above.

The theme of Chapter II ("Biological Mechanism for the Course of the Epidemic Process") is connected with the problem of defining the "epidemic process of zoonotic infections". As is known, the process is a successive exchange of conditions. However, as the author correctly points out "here the infection of man is none other than a biological accident" (page 45). Couldn't a combination of these "biological accidents", not connected directly with each other (but connected with the process of the spreading of the infection among animals), be called an epidemic process? The drawing (page 46) is satisfactory in that it reflects the scheme of an epizootic and not epidemic process. The emergence of an epidemic process during zoonoses is possible, however, only in exceptional circumstances (for example, during pneumonic plague).

The problem of carriage during infectious diseases is dealt with insufficiently, which is apparently connected with the weak opportunity for studying it. Thus, there is a weak argument of the thesis that "parasites do not always display pathogenicity. And in certain cases pathogenic parasitism is manifested in the form of healthy carriage." (page 57). Somewhat beyond this the author himself states that it is possible that there are insidious forms of disease, when these or those pathological manifestations are overlooked or are not detected". This proposal is fully confirmed in the available works on dysentery. Therefore, should one come to the understanding that "healthy carriage" is considered as - the absence of any pathological influence of a pathogenic microorganism or the fact that the patient does not turn to medical help?

Completely agreeing with the author's argument that in a number of infections (for example, meningitis, poliomyelitis) a clinically expressed form is an accidental phenomenon, we consider it important to specify what clinical form is characteristic (typical) for the stated infection.

In the monograph there is a very detailed review of the problem concerning the mechanisms of transmission of infection. However, in essence the author is not dealing with the mechanism, but the routes of transmission of infection. In accordance with this, 3 groups of infection are joined under the heading, "Mechanical Routes of Transmission", which in our opinion is not quite correct, since the mechanism of transmission is a more specific and also a more extensive concept than the route of transmission.

Further the author contrasts the "daily-contact and industrial contact" route of transmission of infection to the aerial-droplet and fecal-oral route (page 75). Meanwhile it is well known that the two latter ones are characterized by various mechanisms of transmission of infection. As regards the mentioned "contracts", it seems to us that they specify not even the routes, but the conditions under which the transmission of infection takes place.

The author makes the correct statement that the dust route is characteristic for the transmission not of droplet anthroponoses, but only of certain zoonoses (page 86). It would be right here to make mention of tuberculosis, which based on its origin is unconditionally a zoonotic infection.

Chapert III ("Manifestation of the Epidemic Process") deals with problems on the intensity of the epidemic process. However, the material in this chapter is presented too schematically; it is difficult to make use of the recommendations cited. The meaning of a number of indices and the area of their application have not been broken down. It is apparently proposed that the reader should use the appropriate works to become better acquainted with these problems.

The possibility of putting the Ratkovskiy formula (total number of infections is equal to the sum of typical and atypical cases and symptomless carriage) into practice was not evaluated, inasmuch as it is generally known that the morbidity index is intervallic, and the carriage index - momentary. Consequently, in the cited form the formula cannot be used, especially as the method for determining the total number of carriers among the population is not described.

The manner of computing average prevalence is described incorrectly (page 116).

In this same chapter a review is made of the concept of epidemic (epidemic outbreak) and sporadic indicence, in respect to which there is no common opinion at the present time. The author mentions "sporadic cases" (pages 9, 16), "a sporadic type of incidence" (page 72), and finally "sporadic incidence" (page 115 and further). Which is more correct? If the last term is accepted as such, then this means that it has in mind some statistical index of intensity of the epidemic process. However, the author himself notes sensibly that "various proposals to use statistical methods for delimiting sporadic and epidemic incidence also have not received recognition". Consequently, if the concept of sporadic indicence does not specify the intensity of the process, why then is it used in this case? Would it not be better to characterize incidence as stable, rising, lessening, etc., supporting this determination with the corresponding intensive indices?

At the same time, hidden behind the same indices of morbidity is a different type of epidemic process, which in one case may be called an outbreak, and in another - a chain of sporadic cases. That is why it seems to us that these concepts are more expediently regarded not as statistical but as epidemiological, as this was accepted in practice long ago. In other words, an outbreak (epidemic) is characterized by numerous cases, connected with a common source of infection or a single factor of transmission. With sporadic cases, on the other hand, each newly emerging case of illness has its own source of infection.

Chapter IV ("Evolution of Views on Causes in Epidemiology") deals with problems of history, and also biological and social aspects of the epidemic process, which were the subject of prolonged discussion by native epidemiologists.

In Chapter V ("Theoretical Generalizations on Separate Divisions of Study of the Epidemic Process") there is a detailed consideration of various views on the periodicity and seasonal aspect of the epidemic process. We cannot agree with the author that both the secular fluctuation in the level of infectious morbidity and its periodicity are determined "in the majority of cases . . . . . by changes of a social order."

Perplexity is caused by the author's angry reproof in reference to those practical workers who consider seasonality a result of a deficiency in antiepidemic measures. Did any of them deny the necessity of studying the concrete causes for the seasonal fluctuations of incidence? Well then, the reationality of anti-epidemic measures depends on this. And if in the present day this rationality has not been achieved, it is necessary to seek the cause in the insufficient development of problems dealing with the seasonality of incidence. Once more the monograph being reviewed has satisfied us in this. Then how is it possible to accuse the practical workers, when relative to concepts of seasonality a common opinion has not been reached among investigators?

The classification of infectious diseases is also reviewed in Chapter V. First of all, it is necessary to stipulate what classification is confined to. From the point of view of studying general biological regularities it is necessary to have a classification based on the evolutionary-adaptation principle. However, the more widely known classification of L. B. Gromashevskiy, supplemented by I. I. Yelkin, I. R. Stepanov, and S. V. Guslits, has a more limited - medical - tendency and a more specific name: "Classification of Infectious Diseases of Man". Here there is a lack of understanding relative to the grouping of zoonoses, however, it would be considerably easier to find a general point of view if acceptance was granted to the proposal, expressed many times by native authors, to designate as zoonoses, not diseases which are inherent to animals, but those disease of man with which he is infected from animals. It is quite apparent that referring anthrax to the group of alimentary zoonoses brings only confusion into classification.

Besides this, the stated classification (pages 202-203) does not reflect infections which are transmitted, according to the definition of the author, "with the help of various factors of the external medium". (page 74).

One section of Chapter VI ("Prevention of the Epidemic Process, the Struggle With It, and Its Eradication") deals with the epidemic focus. The author accepts (with certain additions) the definition of focus, given many years ago by L. V. Gromashevskiy. Unfortunately, in practice the solving of a problem concerning the limits of a focus is usually based on a conditional notion and (in accordance with the accepted definition) factually leads to the determination of the collective in which the disease has been recorded (family, home, school, industry, etc.). But it is well known that the very territory of a focus is far from always the defining condition for the transmission of an infectious onset. From here a number of authors have attempted to connect the borders of a focus not with a territory, but with the criterion of contact (direct and indirect) between persons.

Besides this, the papers by Ye. N. Pavlovskiy and his pupils convince us that focus of zoonotic infection (particularly natural zoonoses) is another concept.

Doubt is caused by the statement of the author that the period of action of a noncontagious focus is established by "fluctuations in the incubation period of the disease from minimum to maximum" (he presumes "diseases of man"). Save perhaps a sick animal should regularly infect the surrounding people so that the epidemiologist does not get the impression that the focus is eradicated? It is known that the infection of man in an environment of sick animals may take place with various intervals, including those which considerably exceed the maximum incubation period for the disease in man, if it is understood that the conditions for the infection of man have not been eradicated.

The author of the monograph has brought up some outstanding and complex problems and it is understandable that one cannot expect to obtain an exhaustive answer to them. Just the bringing up of these problems is already of great merit to the author.